

Claims:

1. A method for enzymatic nucleic acid labeling which uses a DNA polymerase, a nucleic acid template, a primer and modified nucleoside triphosphates which can be incorporated by the polymerase into the newly synthesized DNA whereas at least two natural deoxynucleoside triphosphates are replaced entirely by the corresponding modified deoxynucleoside triphosphates or derivatives thereof such that in the nucleic acid generated, two of the four bases carry modifications and full target length is achieved.
2. The method of claim 1 wherein the modified nucleotides incorporated into the newly synthesized nucleic acid are detectable by nonradioactive methods.
3. The method of claim 1 in which enzymatic nucleic acid labeling is performed in a reaction in which three natural deoxynucleoside triphosphates are replaced entirely by the corresponding modified deoxynucleoside triphosphates or derivatives thereof such that in the synthesized nucleic acid three of the four bases carry modifications and full target length is achieved.
4. The method of claim 2 in which enzymatic nucleic acid labeling is performed in a reaction in which three natural deoxynucleoside triphosphates are replaced entirely by the corresponding modified deoxynucleoside triphosphates or derivatives thereof such that in the synthesized nucleic acid three of the four bases carry modifications and full target length is achieved.
5. The method of claim 1 in which enzymatic nucleic acid labeling is performed in a reaction in which four natural deoxynucleoside triphosphates are replaced entirely by the corresponding modified deoxynucleoside triphosphates or derivatives thereof such that in the synthesized nucleic acid consists entirely of modified bases and full target length is achieved.
6. The method of claim 2 in which enzymatic nucleic acid labeling is performed in a reaction in which four natural deoxynucleoside triphosphates are replaced entirely by the corresponding modified deoxynucleoside triphosphates or derivatives thereof such that in the synthesized nucleic acid consists entirely of modified bases and full target length is achieved.

7. The method of claim 5 in which all four bases carry different labels.
8. The method of claim 1 in which the labeling of one nucleic acid strand is performed with one primer used.
9. The method of claim 1 in which the labeling of double stranded nucleic acid is performed in an amplification reaction with two or more or degenerate or Inosine containing primers used.
10. The method of claim 1 in which the enzyme used is a DNA polymerase.
11. The method of claim 1 in which the enzymes used are a reverse transcriptase and a DNA polymerase.
12. The method of claim 1 which is used for DNA synthesis and simultaneous DNA labeling by PCR.
13. The method of claim 1 which is used for DNA sequencing.
14. The method of claim 1 which is used for highly sensitive detection or quantification of one or several specific nucleic acid sequences.
15. The method of claim 1 which is used for detection of specific nucleic acid sequences *in situ*.